

REMARKS

Claims 1-16 are pending in the instant application. Claim 15 is amended herein. No new matter has been added as a result of the amendments made herein.

Claim Objections

Claim 15 is objected to as containing informalities. Claim 15 has been amended herein to address the objections raised by the Examiner. Consequently, the objections to Claim 15 should be withdrawn.

103 Rejections

Claims 1-8 and 10-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable by Carobolante (6,084;378) and Alfrey (2003/0103364). The Applicants have reviewed the cited references and respectfully submit that embodiments of the present invention as are set forth in Claims 1-8 and 10-16 are neither anticipated nor rendered obvious by Carobolante or Alfrey.

Independent Claim 1

The Examiner is respectfully directed to independent Claim 1 which is drawn to a differential load driving circuit, that comprises:

...at least one current source; and at
least one current source switch

operable to couple said at least one current source to said load; wherein said current source is coupled to said load to deliver current to said load during low current conditions at said load, and said PWM signal coupled to said load to deliver current to said load during high current conditions at said load...(Emphasis Added)

Applicants respectfully submit that neither the Carobolante reference nor the Alfrey reference anticipates or renders obvious a differential load driving circuit comprising a current source and a current source switch operable to couple the current source to a load as is set forth in amended Claim 1.

Applicants respectfully submit that the Carobolante reference is related to a method and a circuit for controlling a slew of a coil in a voice coil motor, but does not disclose circuitry which comprises a plurality of power switches coupled to a PWM signal for delivering power to a load during high current conditions and a current source switch to couple the current source to the load during low current conditions. Applicants understand that the Carobolante reference discloses a H-bridge circuit for driving current into a coil of a voice coil motor, and also discloses that a PWM current is applied to the coil in speed phase and a linear current is applied to the coil in the track and follow phase. However, as indicated by the Examiner, the Carobolante reference does not disclose that a current source is involved in these processes.

Further, in the Carobolante reference, only an H-bridge circuit is disclosed. Particularly, the Carobolante reference does not disclose any implementation or circuitry for drive current into a load or coil in the linear mode (the track and follow phase).

The Alfrey reference does not remedy the deficiencies of Carobolante outlined above. More specifically, the Alfrey reference does not disclose a current source switch operable to couple the current source to a load. The switch 601 is not operable to couple the current source to load, or, in other words, the switch 601 is used to cause the currents in 604 and 605 to be equal, see paragraph 0044, lines 19-20. In other words, the switch 601 is always enabled when the entire circuit is turned on. The switch 601 is controlled by the operational amplifier 602 to generate a current, but not used to couple a current source to a load. Further, even if the switch 601 is interpreted as a current source switch such as is contended by the Examiner, there is not any teaching, suggestion or motivation to combine the current source bridge circuit in the Alfrey reference with the H-bridge circuit in the Carobolante reference.

Furthermore, as shown in FIGS. 7, 7a, and 7b in the Alfrey reference, the switch 601 is one of the H-bridge switches. In the present invention, the current source switch

is not used to form H-Bridge differential load driving circuit (see claim 2). The current source switch is operable to couple the current source to the load, but not one of the H-bridge switches. As such, there are both substantial structural and functional differences between the claimed embodiments and the system disclosed by Alfrey. Consequently, the embodiments of the Applicants' invention as are set forth in Claim 1 are neither anticipated nor rendered obvious by Alfrey.

Thus, Applicants respectfully submit that the present invention as disclosed in independent Claim 1 is not anticipated by the Carobolante reference taken alone or in combination with the Alfrey reference, and is in a condition for allowance.

As a result, Applicants respectfully submit that Claims 2-3 which depend from independent Claim 1 are also in condition for allowance as being dependent on an allowable base claim.

Independent Claim 4

The Examiner is respectfully directed to independent Claim 4 which is drawn to an H-Bridge load driving circuit, that comprises:

...at least one current source; and at
least one current source switch

operable to couple said at least one current source to said load; wherein said H-Bridge circuit having a first mode in which said current source is coupled to said load to supply current to said load and a second mode in which at least two of said power switches are coupled to said PWM signal to supply current to said load...(Emphasis Added)

Applicants respectfully submit that neither the Carobolante reference nor the Alfrey reference anticipates or renders obvious an H-Bridge load driving circuit comprising a current source and a current source switch operable to couple the current source to a load as presently claimed in amended Claim 4.

It should be appreciated that independent Claim 4 contains limitations similar to those set forth in Claim 1 and, that these limitations are distinctly different from and non-obvious in view of the subject matter disclosed by the Carobolante reference, the Alfrey reference, and their combination.

Additionally, Applicants respectfully submit that Claims 5-6 which depend from independent Claim 4 are also in condition for allowance as being dependent on an allowable base claim.

Independent Claim 7

The Examiner is respectfully directed to independent Claim 7 which is drawn to an H-Bridge load driving circuit, that comprises:

...at least one current source; and at least one current source switch operable to couple said at least one current source to said load; wherein said H-Bridge circuit is adapted to operate in a linear mode using said at least one current source switch to enable said current source and a PWM mode wherein said switches are controlled with a PWM signal...(Emphasis Added)

Applicants respectfully submit that neither the Carobolante reference nor the Alfrey reference anticipates or renders obvious an H-Bridge load driving circuit comprising a current source and a current source switch operable to couple the current source to a load as presently claimed in amended Claim 7.

It should be appreciated that independent Claim 7 contains limitations similar to those set forth in Claim 1 and, that these limitations are distinctly different from and non-obvious in view of the subject matter disclosed by the Carobolante reference, the Alfrey reference, and their combination. Furthermore, neither the Carobolante reference nor the Alfrey reference discloses a current source switch to enable a current source so as to operate a driving circuit in a linear mode.

Additionally, Applicants respectfully submit that Claims 8 and 10 which depend from independent Claim 7 are also in condition for allowance as being dependent on an allowable base claim.

Independent Claim 11

The Examiner is respectfully directed to independent Claim 11 which is drawn to a differential driving circuit for driving a thermal electric cooler, that comprises:

...at least one current source; and at least one current source switch operable to couple said at least one current source to said load; wherein said differential driving circuit having a first mode in which said at least one current source switch is enabled to couple said current source to said load to supply current to said load and a second mode in which at least two of said power switches are coupled to said PWM signal to supply current to said load.. (Emphasis Added)

Applicants respectfully submit that neither the Carobolante reference nor the Alfrey reference anticipates or renders obvious an H-Bridge load driving circuit comprising a current source and a current source switch operable to couple the current source to a load as presently claimed in amended Claim 11.

It should be appreciated that independent Claim 11 contains limitations similar to those set forth in Claim 1

and, that these limitations are distinctly different from and non-obvious over the subject matter disclosed by the Carobolante reference, the Alfrey reference, and their combination. Furthermore, neither the Carobolante reference nor the Alfrey reference discloses a current source switch to enable a current source so as to operate a driving circuit in a linear mode.

Additionally, Applicants respectfully submit that Claims 12-16 which depend from independent Claim 11 are also in condition for allowance as being dependent on an allowable base claim.

Claim 9 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Carobolante (6,084,378) and Alfrey (2003/0103364) in further view of Walter (2003/0155813). The Applicants have reviewed the cited references and respectfully submit that embodiments of the present invention as are set forth in Claim 9 are neither anticipated nor rendered obvious by Carobolante, Alfrey or Walter.

Walter does not teach or suggest a modification of Carobolante and Alfrey that would remedy the deficiencies of Carobolante and Alfrey outlined above. More specifically, Walter does not teach an H-Bridge load driving circuit having at least one current source switch operable to operable to couple said at least one current source to said load as is

recited in Claim 7 (from which Claim 9 depends). Consequently, Carobolante, in view of Alfrey in further view of Walter does not anticipate or render obvious the embodiments of Applicants' invention as set forth in Claim 9.

Conclusion

In light of the above-listed remarks, the Applicants respectfully request allowance of the remaining Claims.

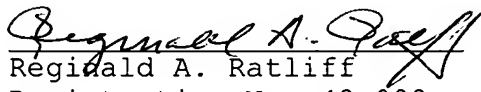
Based on the arguments presented above, Applicants respectfully assert that Claims 1-16 overcome the rejections of record. Therefore, Applicants respectfully solicit allowance of these Claims.

The Examiner is urged to contact the Applicants' undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Respectfully submitted,

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